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ABSTRACT

Explanations for differences in reading proficiency should be constructed around an atlas of reading-related individual differences in cognition. Such an atlas should include well-documented "bottom-up", text-driven reading strategies and less thoroughly investigated "top-down", schema-driven reading strategies. Research findings suggest the following differences in the use of text-processing strategies among good and poor readers: (1) good readers both report and demonstrate spontaneous use of text lookbacks to retrieve unrecalled information needed to resolve a cognitive task, whereas poor readers generally do not; (2) in making wise decisions about allocation of cognitive effort, good readers are better than novices in choosing intermediate-level information in text as external memory aids, in selecting segments previously found difficult for extra study, and in spending more study time on difficult stories than on easy reading strategies and less thoroughly investigated "top-down," ones; (3) good readers have a greater facility for summarizing text; and (4) good readers, more than poor readers, seem to have a repertoire of strategic behaviors that begins with a clear focus on meaning, including practiced monitoring of comprehension failure. This list needs to be extended to include differences about what learners are actually doing while processing the text (i.e., "top-down" processes). Researchers need to seek behavioral indices of strategic use to corroborate reported use, to separate the effects of development and of proficiency level, and to use some real-life "open-book" tasks so that results can be generalized to the critical school learning demands that learners face daily. (HOD)

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Text Processing Differences Among Readers

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Text Processing Differences Among Readers

Reading performance differences among learners are of interest to both researchers and practitioners. Researchers ultimately want to know what factors precipitated the gaps between good and poor readers, and practitioners want to know what remedies can narrow those gaps. Both groups acknowledge the complexities of studying and treating differences (i.e., that performance varies continuously, that readers clustered at the "poor" end of the continuum are not identical in performance profiles, that particular texts and tasks can make "good" readers of poor and "poor" readers of good).

Thomas Carr (1981) has provided us - researchers and practitioners - with what appears to be a useful perspective on the matter in his recent paper. He argues that explanations for differences in reading proficiency have usually focused on single factors, and that single-factor theories are "too simple to be correct" (p. 74). He urges that research in the area be directed toward construction of an "atlas of reading-related individual differences in cognition" (p. 74), rather than toward attempted identification of a single cause of reading failure.

Carr's call for this atlas of differences is similar to Brown's (1980a) charge to psychologists interested in developmental issues that they begin inquiry by providing "as rich and detailed a description as possible of the qualitative differences between experts and novices in any task domain" (p. 45).

Both Carr and Brown seem to be saying that generating a list of differentiating factors should precede haphazard intervening to reduce the impact of a single factor (cf. Farnham-Diggory, 1978). It has occurred to me, as I have thought about this potential list, that interactive views of reading process (cf. Rumelhart, 1980; Rumelhart & Ortony, 1977) demand that both "bottom-up" (i.e., graphic input-directed) and "top-down" (i.e., knowledge base-directed) processing differences be included. That seems unarguable. It has further occurred to me, however, that we know a great deal more about text-driven process differences than we do about schema-driven ones. Why that is may not be unarguable.

Some reading experts would, I suspect, claim that the imbalance results from bottom-up processes mattering more in the total reading performance differences picture. Perfetti (1980), for instance, states that "there is an important asymmetry between conceptually-guided and graphically-based processes" (p. 198) in that the latter can operate without the former but not vice-versa. Perfetti's statement that "no matter how helpful conceptual data are, they are neither essential nor definitive" (p. 198) does not strike me as unarguable. Neither does his conclusion that reading problems of inaccurate, effortful, or very slow use of graphic data are far more pervasive than failure to use conceptual guidance effectively.

Some reading experts would, I think, want to accept the abundant evidence on bottom-up processing failure, but reject

the notion of cause of asymmetry as developed by Perfetti. These people might well want to claim that a relatively meager research literature on contributions of top-down processing failure to general reading dysfunction might be viewed in an alternative manner: not as a result of theoretical unimportance or empirically demonstrated irrelevance, but rather as a result of slow development of sound research methodologies to externalize complex, unobservable mental events (Brown, 1980b). World knowledge systems and strategic behavior repertoires, after all, are simply not as accessible to reading researchers as are oral reading speeds and recognition accuracy rates. The bottom-up processing failures may be more susceptible than top-down failures to documentation, but not necessarily more of a contributing force to general reading difficulty. Until we have devoted as much research energy and ingenuity to exploring the latter as we have to studying the former, our atlas of differences is incomplete, and Perfetti's claim can neither be strongly endorsed nor briskly dismissed.

My purpose in this paper will be to mention the well established bottom-up code-breaking portion of the atlas of reading differences, and then to argue for the importance of expending research energy on a particular subset of top-down differences - those of strategic behavior repertoires. It is my view that once we get good at gaining access to these repertoires (a substantial methodological dilemma), we will find them to be an important part of the atlas of individual differences in reading.

The mention of code-breaking skills that are reliably related to differences in reading performance can be quite straightforward. Among such skills are: 1) accuracy in decoding of words (Golinkoff, 1975-1976); 2) speed of coding operations (Perfetti & Lesgold, 1977, 1979); 3) spontaneous application to print of syntactic knowledge (Isakson & Miller, 1976); 4) size of linguistic units read and maintained in working memory (Cromer, 1970; Daneman & Carpenter, 1980; Kail & Marshall, 1978); and 5) speed and accuracy of retrieving coded information from memory (Kail, Chi, Ingram, & Danner, 1977; Prawat & Kerasotes, 1978). The relative import of each of these skills in successful reading is unresolved, but there is no real argument within the reading research community that most good readers have or do what is desirable within this component list, and most poor readers have or do not.

Given the construct of "cognitive capacity" (Adams, 1979; Britton, Glynn, Meyer, & Penland, 1982; Britton, Ziegler, & Westbrook, 1980), then, a fairly strong argument can be made for poor code-breakers being, inevitably, poor reading comprehenders. Given that cognitive capacity is not boundless; that transforming, reducing, elaborating, storing, recovering, and using (Neisser, 1982) ideas can be thwarted by low-proficiency management of letters, words, and phrases (that makes heavy demands on valuable cognitive energy), one seems destined to accept that capacities might easily be taxed and overextended, that comprehension might break down for poor code-breakers. Perfetti and Lesgold (1979), in outlining their

advocacy of practice to develop decoding facility, actually make an argument along these lines, stating that rapid, accurate, automatic decoding releases cognitive resources from code-breaking to meaning-getting. Less attention is required for decoding, that is, as word recognition is performed more rapidly and effectively (cf. Chall, 1979; Gough, 1981; Samuels, 1979). The empirical support for the view that readers with low decoding proficiency will experience comprehension problems (or, worded differently, that lack of code-breaking skills is related to poor general reading performance) exists. What is far less certain, as I said earlier, is the relative impact of these bottom-up deficits and other (less examined) top-down deficits.

There are certainly poor comprehenders who can break the code. Cromer (1970) found some, Guthrie (1973) found some, and I've had no difficulty in a series of studies (Garner, 1980, 1981; Garner & Anderson, 1981-1982; Garner & Reis, 1981; Garner & Taylor, 1982) in finding some. We find them in our University of Maryland summer clinic in abundance each year: learners whose decoding strengths and comprehension weaknesses argue for at least partial independence of decoding and comprehension in reading. As Gibson and Levin (1975) point out, and as we have discovered, a learner who is good at fast decoding will not necessarily extract meaning from print without effort.

It is such a learner on whom I'll focus for the remainder of this paper. Specifically, I intend to address strategic

behavior repertoires of such learners. Without denying the importance of top-down proficiencies that I'll mostly ignore - proficiences such as knowledge and use of structure of prose (Meyer, 1977a, 1977b; Thorndyke, 1977), use of general world knowledge (Anderson, 1977; Anderson, Reynolds, Schallert, & Goetz, 1977; Bransford & Johnson, 1973; Langer & Nicolich, 1981; Spiro, 1980; Tannen, 1979); prediction of yet-unread words and ideas (Goodman & Goodman, 1977) - I'll address what people have variously described as intentional activities in response to a need (Flavell & Wellman, 1977); purposeful means of comprehending (Olshavsky, 1976-1977); economical behavior displayed by skilled readers (Gibson & Levin, 1975); deliberate, planful, conscious activities generated in response to a triggering event (Brown, 1980); decomposition of the goal of a whole task into subsidiary goals and subsequent effort to reach these goals (Simon, 1975); or self-management of one's cognitive resources (Paris, Newman, & McVey, in press).

Do good and poor, novice and expert, readers differ in the use of text-processing strategies? Are there robust findings of such differences? Do these differences need to be included in the atlas Carr suggests alongside the code-breaking differences? Yes, sort of, and probably. There is evidence of differences, we need more studies along this line of inquiry, and it appears these differences do further sort out from among relatively proficient decoders the readers who efficiently manage ideas in print and those who do not. As Aulls (1981) states rather boldly, one of the central findings

of good reader-poor reader research is that "absence, disuse, or ineffective use of strategies appears to distinguish good and poor readers who have similar reading skills knowledge" (p. 88).

Let us list some of the specific findings. We know for instance, that:

1. Good (particularly older) readers both report (Hare, 1981; Hare & Smith, 1982) and demonstrate (Garner, in press b; Garner & Reis, 1981; Garner, Wagoner, & Smith, Note 1) spontaneous use of text lookbacks to retrieve unrecalled information needed to resolve a cognitive task (typically to answer questions), whereas poor readers generally do not. Further, good readers usually know <u>when</u> to use lookbacks (for text-based, not-reader-based questions), and <u>where</u> to use them (in sampling the text for information cued by questions, not by rereading the entire text), whereas poor readers very frequently do not (Garner, Wagoner, & Smith, Note 1).
2. In making wise decisions about allocation of cognitive effort, expert readers are better than novices in choosing intermediate-level information units in text as external memory aids (Brown, Smiley, & Lawton, 1978); in selecting segments previously found difficult for extra study (Brown & Campione, 1977); and in spending more study time on difficult stories than on easy ones (Owings, Petersen, Bransford, Morris, & Stein, 1980).

3. Paralleling strong developmental differences in text summarizing skill (cf. Brown, Campione, & Day, 1981; Brown & Day, Note 2), it appears that readers at disparate points on the proficiency continuum also differ (Winograd, 1981) in facility for efficient (i.e., a high number of important ideas expressed in a low number of words, Garner, in press a) text summarization.
4. Good readers, more than poor readers, seem to have a repertoire of strategic behaviors, a general plan of attack on text and task (Forrest & Waller, Note 3) that begins with a clear focus on meaning (Paris & Myers, 1981), including practiced monitoring of comprehension failure. For monitoring, that is recognition of "clunks" of comprehension failure (Anderson, 1980), we have pervasive evidence (e.g., Garner, 1980; 1981; Garner & Taylor, 1982; Winograd & Johnston, 1980) of good reader-poor reader differences.

These four categories of good reader-poor reader strategic behavior differences surely do not exhaust the set of differences of this sort that exist among readers. Both researchers and practitioners have intuitions about other differences. The problem in extending the list - as supported by empirical findings - is one mentioned earlier: that of externalizing what are essentially internal events (i.e., events such as deciding something doesn't "click", making a decision to look

back to an earlier part of the text higher on the page, holding an idea as tentative, rehearsing of an idea for later retrieval, being surprised by a particular piece of information, noting that a particular segment of text is information-laden and will require more study later). We can ask people to report these internal events, and hope that the process-report disparity (Ericsson & Simon, 1980; Garner, in press c; Garner & Alexander, 1982) is minimal. Or we can track processing, attempting to make covert processes at least partially overt. Neither tactic is a wholly satisfactory resolution of a large dilemma, and - in my opinion - the size of the dilemma accounts for our failing so far to generate a long list of strategy-related individual differences in text processing. Older studies (e.g., notetaking investigations) focusing on reading or study product rather than process, are not helpful in generating insights about how learners differ in what they do as they read to learn. We need to devise ways, as researchers, to discover what learners are actually doing while processing text (Brown, 1981).

As we conduct investigations to extend the strategic behaviors differences list, we need to be sensitive to some of the flaws of earlier research in this area. We need, for instance, to seek behavioral indices of strategic use to corroborate reported use. We need to separate the effects of development and of proficiency level; we might, in this regard, attempt replications of strategy difference results with reader samples from a variety of age groups (Aulls, 1981). We need to use relatively uncontrived schoollike texts (Garner &

Alexander, 1981) and some real-life "open-book" tasks (Flavell & Wellman, 1977), so that results can be generalized to the critical school learning demands which learners face daily. We need to separate spontaneously demonstrated strategies from briskly induced strategies from trained strategies. We need to know if the effects of strategy training are generalizable and durable (Campione & Brown, 1978). We need, eventually, to make suggestions for classroom practice. Readers in the upper elementary grades and beyond - faced with long text assignments to be managed in the absence of teachers - need a repertoire of strategies to assist them. They need to know "who is in charge" (Smith, 1982, p. 2) in such settings: readers, not texts.

A few suggestions for classroom practice are available from even the relatively skimpy strategic behavior differences research literature. One suggestion arising from my research and the research of others is that students be given direct instruction in the judicious use of text lookbacks (i.e., that they be shown <u>why</u> they work, <u>when</u> they work, and <u>where</u> they work - and that they be shown these things across a number of diverse texts). The strategy works (Alessi, Anderson, & Goetz, 1979). Good readers tend to use spontaneous lookbacks, but poor readers do not. Readers can be trained (Garner, in press b) to use lookbacks successfully through repeated exposure to triggering questions that demand repeated access to text. Tom Anderson (1979) and Baker and Brown (in press) have independently concluded that well established

strategies (or non-strategies) are not particularly susceptible to change unless a dilemma arises (in this instance, the triggering questions), the resolution presents itself (lookback training), and the resolution plan works (answers are found in text). Lookbacks can assist readers during reading in managing text.

A second suggestion I would make to practitioners also involves direct instruction, but is aimed in this case at student activity after reading is completed. Peter Winograd's dissertation (1981) pointed up major eighth-grade poor reader summarizing skill deficits. In his study, the major "strategy" for selection of ideas to be presented in the summary among the poor readers appeared to be selecting the ideas from the first quartile of the expository text at hand, and writing until no space on the summary sheet remained. We know from Brown and Day's (Note 2) work that training in preferred strategies works. Because summarizing is often required to generate evidence of what has been understood and remembered from text, readers who have difficulty comprehending and summarizing are doubly disadvantaged, and need our explicit instructional assistance.

So, to summarize my major thesis in this paper, I think we do want to construct the "atlas of reading-related individual differences in cognition" Carr (1981, p. 74) commends to us. I think the atlas should include well-documented "bottom-up" factors and less thoroughly investigated (and thus less well documented) "top-down" factors. Among the latter set would

appear the strategic behaviors that differentiate good and poor readers. Use of text lookbacks and text summarizing proficiency are two good candidates for this portion of the atlas. There will, no doubt, be others, as good and poor readers engage text, and researchers track the processes involved.

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